

OUTCOMES OF SUPERBUILDINGS PROJECT AND FUTURE PROSPECTS OF SUSTAINABILITY PERFORMANCE ASSESSMENT AND BENCHMARKING OF BUILDINGS

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Summary

Project Sustain Sustainability and Performance assessment and Benchmarking of Buildings (SuPerBuildings) was after 3 years finished in 2012. The main outcomes of the project include top-down approach for structure of sustainability assessments of buildings, detailed analysis of selected indicators and verification of their validity. The project also looked into building design and construction processes in order to find the most effective ways of steering. SuPerBuildings project also dealt with use of building information models (BIMs) for sustainability assessment.

Keywords: building sustainability assessment, indicators, steering, assessment structure, BIM

1 Introduction

1.1 Background

Sustainability and Performance assessment and Benchmarking of Buildings (SuPerBuildings), an FP7 project of the European Commission, started in January 2010 and was finished in December 2012. Main objective of the work was to develop sustainability indicators for buildings, methods for the benchmarking of sustainable buildings and recommendations for the effective use of benchmarking systems as instruments of steering and in building processes. The consortium consisted of fifteen European partners under coordination of VTT Technical Research Centre of Finland.

2 Objectives

The main objectives of SuPerBuildings project were:

- To develop the potential of sustainability assessment and benchmarking methods in progress towards sustainable built environment;
- To develop indicators for assessing the environmental, social and economic performance of buildings;
- To develop criteria for the benchmarking of sustainable buildings;

- To develop recommendations for the use of indicators in different stages of building process and in steering
- To disseminate the results for standardisation bodies, policy makers and construction professionals and encourage the development of sustainable building services.

3 Main findings

The focus of the SuPerBuildings project was to develop understanding about assessment methods and performance levels paying special attention on the validity of indicators and the comparability of assessment results. Validity determines whether the indicator truly measures what it was intended to measure or how truthful the results are. The outcomes of the research work suggest that a top-down approach should be followed in the selection of indicators in order to ensure the validity of sustainability assessments [1].

Two main criteria for individual indicators are:

- Sustainability indicators of buildings must indicate an issue of concern of sustainable development;
- Buildings must have a significant impact on that issue of concern.

A whole deliverable is dedicated to issues related to validity of indicators. *D4.1 Systematic structure for sustainable building assessment with special focus on the validity of sustainability indicators* is available for download at the project website [5].

The goal of the project was not to develop a uniform assessment system with a defined list of indicators but the aim was to support the further development of existing systems. The discussion focused on indicators for which there are still lack of information about different factors (e.g. carbon footprint) or methodological issues (e.g. land use) and on indicators that are missing at the moment (e.g. in the field of economics; or aesthetics).

SuPerBuildings selected the following indicators:

- Rational use of water;
- Consumption of non-renewable primary energy;
- Land use;
- Global warming potential;
- Construction and demolition waste generation;
- Water pollution due to material leaching;
- Hygro-thermal comfort;
- Visual comfort;
- Indoor air quality;
- Cultural heritage;
- Aesthetic quality;
- Life cycle costs;
- Long-term stability of value.

The project showed that there is a lot of – especially local – understanding about the typical and best performance values of different building regarding certain sustainability indicators. However, much work is still needed to improve understanding of benchmarks and also to develop good processes for the determination of benchmarks. The possible sources for benchmark values depend on the type of the benchmark and can be outlined as follows:

- Target values: political targets, technical optimums, economic optimum;
- Best practice value: best practice, upper quartile;
- Reference value: median value;
- Limit value: legal minimum, prescriptive minimum.

SuPerBuildings studied the effective use of sustainability indicators in different stages of building processes. The description of the process and the recommendations to achieve a higher level of sustainability were given for the following stages:

- Customer briefing;
- Programming;
- Bidding;
- Design;
- Implementation;
- Use and maintenance.

The project studied the ability of BIM to provide the needed input information in order to calculate the indicator values. The BIM is a concept that represents a way of working based on integrated exchange via ICT solutions. To allow such exchanges, a specific open standardized language has been developed (IFC). The work results show that many of the indicators are already supported by the IFC4 but there are still some gaps. The combined use of IFC4 and Information Delivery Manual (IDM) provides the right tools to ensure the technical and semantic integration of SuPerBuildings indicators to the BIM. More details on utilization of BIM in sustainable building design, optimization and assessment processes are available in deliverable *D6.3 Recommendations for the integration of sustainable building assessment and benchmarking methods with BIMs*, which is available also at the project website [5].

SuPerBuildings analysed various steering processes of built environment and defined that an effective steering mechanism [1]:

- Has an impact on its focus area;
- Has support from the citizens and building owners;
- Is feasible, because tools needed in assessment and verification are available and accessible for all who need those and because guidelines and instructions needed are clear.

The project dealt with the following types of instruments:

- Normative control and regulatory instruments;
- Informative control and regulatory instruments;
- Economic and market-based instruments;
- Fiscal instruments and incentives;
- Support and information;
- Municipal steering.

Sustainable building indicators are mature enough and should be actively be brought to guide all life cycle phases of buildings. The following recommendations were formulated: Comprehensive understanding about the goal, Guidelines for planning and design, Wider scope for regulatory instruments, Development of municipal support and building supervising processes, Development of substantiation processes in performance based procurement, Further economic support for the refurbishment of existing buildings.

All major outcomes of the SuPerBuildings project are available in the final report [4], which is available also online at [5].

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